

Serial No. 10/087,716
Atty. Doc. No. 01P05135US01

Amendments To the Claims:

Please amend the claims as shown. Applicants reserve the right to pursue any canceled claims at a later date.

1. (currently amended) A component adapted for operation at an elevated temperature, the component comprising:

a substrate material;

a thermal barrier coating disposed on the substrate material, the thermal barrier coating further comprising:

a layer of ceramic material;

a plurality of inclusions having a coefficient of thermal expansion greater than that of the ceramic material disposed below a free surface of the ceramic material; and

a crack extending from respective ones of the plurality of the inclusions to the free surface of the ceramic material.

2-3. (canceled).

4. (original) The component of claim 1, further comprising:

the substrate material comprises a superalloy material;

the ceramic material comprises one of the group of alumina, zirconia, yttria-stabilized zirconia, and magnesia-stabilized zirconia; and

wherein the inclusions comprises a material having a coefficient of thermal expansion greater than that of the ceramic material and comprise one of the group of a polymer, ceramic, glass and metal material.

5. (original) The component of claim 1, wherein the inclusions comprise hollow spheres of material having a coefficient of thermal expansion greater than that of the ceramic material.

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6. (original) The component of claim 1, wherein the inclusions comprise a solid material having a coefficient of thermal expansion greater than that of the ceramic material.

7. (currently amended) A thermal barrier coating comprising:
a layer of a ceramic material having a free surface;
a plurality of inclusions having a coefficient of thermal expansion greater than that of the ceramic material disposed below the free surface of the layer of ceramic material;
a plurality of cracks extending from respective ones of the plurality of inclusions to the free surface.

8-9. (canceled).

10. (original) The thermal barrier coating of claim 7, further comprising:
the ceramic material comprising one of the group of alumina, zirconia, yttria-stabilized zirconia, and magnesia-stabilized zirconia; and
the inclusions comprising a material having a coefficient of thermal expansion greater than that of the ceramic material.

11. (original) The thermal barrier coating of claim 7, wherein the inclusions comprise a solid material having a coefficient of thermal expansion greater than that of the ceramic material.

12. (original) The thermal barrier coating of claim 7, wherein the inclusions comprise a hollow material having a coefficient of thermal expansion greater than that of the ceramic material.

13-20 (previously cancelled).

21. (currently amended) A thermal barrier coating comprising:
a layer of a ceramic material having a free surface;

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a plurality of stress relieving cracks extending from the free surface into the ceramic material, the cracks extending into respective voids formed from inclusions having a coefficient of thermal expansion greater than that of the ceramic material and disposed within the ceramic material below the free surface so that the cracks have no crack tip, the voids acting as respective crack arrestors within the ceramic material.

22. (currently amended) A thermal barrier coating comprising a top free surface divided into segments defined by a plurality of cracks extending from the top free surface into the thermal barrier coating to respective crack-arresting inclusions having a coefficient of thermal expansion greater than that of the ceramic material and disposed below the top free surface.

23. (previously added) The thermal barrier coating of claim 22, wherein the inclusions comprise voids.

24. (new) The component of claim 1, wherein the inclusions have a decomposition, melting or evaporation temperature that is at or below a maximum ceramic material processing temperature.

25. (new) The component of claim 1, wherein the inclusions are decomposed, melted or evaporated when the ceramic material is processed to form voids in the thermal barrier coating.

26. (new) The component of claim 1, wherein the maximum ceramic material processing temperature is equal to a sintering step that cures and densifies the ceramic material.

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27. (new) The component of claim 1, wherein the sintering step is 1,000°C above the stress free temperature of the ceramic material.

28. (new) The component of claim 1, wherein the coefficient of thermal expansion of the ceramic material is $10e^{-6}K^{-1}$.

29. (new) The component of claim 1, wherein the coefficient of thermal expansion of the inclusion is twice coefficient of thermal expansion of the ceramic material.

30. (new) The component of claim 1, wherein the inclusion comprises a polymer, ceramic or metal.

31. (new) The thermal barrier coating of claim 7, wherein the inclusions have a decomposition, melting or evaporation temperature that is at or below a maximum ceramic material processing temperature.

32. (new) The thermal barrier coating of claim 7, wherein the inclusions are decomposed, melted or evaporated when the ceramic material is processed to form voids in the thermal barrier coating.